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The Circular Structure at the Castalian Springs Site, (40SU14), Sumner County Tennessee

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THE CIRCULAR STRUCTURE AT THE CASTALIAN SPRINGS SITE, (40SU14), SUMNER COUNTY TENNESSEE

by

Brandy Alexandria Dacus

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ABSTRACT

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Magnetometer and ground-penetrating-radar surveys in 2006 and 2009 identified a 22 m diameter circular signature on the northeastern corner of the plaza at the Castalian Springs site in Middle Tennessee. The 2010 Middle Tennessee State University Field School excavations focused on an area coinciding with a geophysical signature. The anomaly, hypothesized to be an anthropogenic feature, was tested and shown to be an extensive archaeological feature representing a large, circular public structure. An arrangement of human skulls within post-demolition features at the structure's center suggests ceremonial activities were held at the location. Radiocarbon dates point to a brief time period, during the fourteenth century, for the building's use, dismantling, and post-demolition activities. The structure appears to share some similarities with earth lodges excavated at Macon Plateau and Moundville, while possessing other unique characteristics.

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Introduction and Research Goals

The application of geophysical techniques to mapping archaeological sites offers an opportunity to document subsurface anthropogenic features. In the Southeastern United States, magnetometry is a widely applied method employed in mapping archaeological sites, but other commonplace techniques, such as ground penetrating radar, have not been widely tested for effectiveness (Conyers 2004; Kvamme 2003). A better understanding of both the limits and potential for geophysical surveys can be achieved by testing anomalies. In addition, employing real-time, GPS-based collection strategies may increase the range of magnetometry data that can be rapidly collected (Gaffney 2008).

To examine the utility of geophysical testing at large Southeastern sites, a program of three separate geophysical surveys at the Castalian Springs site, (40SU14), was employed. Each geophysical survey recorded a large circular signature measuring approximately 20 m in diameter southeast of Mound 2, the primary platform mound. Geophysical testing provided the location of a possible structure. Excavation was then undertaken to confirm potential architectural remains and construction techniques at the location. Investigations of this single circular magnetic anomaly will contribute to an understanding of Mississippian towns in the Middle Cumberland River Valley.

The planned excavations of the geophysical anomaly centered on three research questions. First, is the circular magnetic anomaly discovered through geophysical testing an anthropogenic structure? If so, we would expect to see architectural elements such as central support posts, roofing, inner partitions, and possible inner hearths. Secondly,

when was this structure built and used within the site chronology and for how long? Third, if the anomaly is a structure, then what was its function or functions at the site? If the anomaly is a Mississippian structure, then, it also should provide information about its function. Physical aspects of the structure, including architectural features inherent in its design and artifacts will possibly underscore its function and or significance to the community. Understanding such a large structure within the community may provide us with insights into the public and symbolic life present in the Castalian Springs community.

Castalian Springs Background

The Castalian Springs site is located in Sumner County, Tennessee, near Bledsoe Creek in the unincorporated community of Castalian Springs, about 6 miles east of Gallatin. The site was acquired by the State of Tennessee in 2005 after the death of the owner, Leon Shoulders, a well respected county resident and philanthropist. Castalian Springs is one of several major Mississippian sites in the Middle Cumberland Region of Tennessee that was occupied between A.D. 1000 and 1400. Mississippian societies had a complex political structure and a distinct increase in material culture compared to earlier cultures (Muller 1997). These Mississippian societies appear to have been socially ranked chiefdoms with inherited leadership positions (Muller 1997). In the Middle Cumberland Region, towns were both religious and political centers supported by smaller, outlying villages and farmsteads. At Castalian Springs a palisade possibly enclosed an area of approximately six hectares, including the town and mound complex (Smith 1992, 2006).

Ralph E.W. Earl first reported the site in 1820 when he acquired objects from it to display at the then recently established Nashville Museum. William E. Myer conducted the first professional excavations at Castalian Springs. He worked at the site in 1891, 1893, and the winter of 1916-1917 for a total of three months (Smith 2006). These investigations produced maps, records, and artifacts that suggest the town possessed a complex social structure. Unfortunately, published reports are lacking due to Myer's untimely death in 1923, resulting in minimal academic focus on the Castalian Springs site until the recent excavations of 2005-2010.

Based on Myer's field notes, Castalian Springs site features include mounds, a central plaza, and possibly an enclosing palisade (Smith 2006). Mounds within the site's central area include a large platform mound with conical summit, a second large platform mound, and two smaller platform mounds adjacent to the plaza. Mound 1 was a large burial mound on the eastern edge of the plaza. Structure 1, located during the summer 2006 excavations, is a large rectangular wall trench structure with rebuilt wall trenches indicating the expansion of the building at several times before abandonment. Structure 1 provides evidence of civic-ceremonial life in its large size and in the specialized interments in the form of infant remains and mica flakes found in association with the structure's wall trench features. Additionally, several roughly square-to-rectangular structures have been excavated west of the plaza area. Although these structures are not all contemporaneous (as evidenced by overlapping wall patterns), they fall within the more typical size range of approximately 4.5m on a side for residential structures in the Nashville area (Smith 1992).

The 2005-2010 archaeological field investigations at Castalian Springs were directed by Kevin E. Smith. The 2005 excavations explored a portion of the site south of Highway 25, most likely located outside the palisade, and yielded Mississippian artifacts and a few midden features (Beahm and Smith 2008). The 2006-2009 excavations focused on further understanding building locations around the plaza area and investigating the stratigraphy of the central platform mound.

The Circular Anomaly. With a solid background of site history and layout based on the 2005 to 2009 excavations, the research focus shifted to possible origins of the magnetic anomaly near the site's center. Interest in excavating the circular feature is enhanced due to Myer's report in 1917 of a possible building at the same approximate location as the geophysical anomaly (Smith 2006; Smith et al. 2009). Myer's unpublished field notes contained hand drawn site maps that include a small circular area labeled Number 24 and was referred to in his notes as a "council house" (Figure 1). This feature noted by Myer is presumed to have been visible on the surface. Prior to the 2010 excavation, the field map was the single piece of evidence connecting the magnetic anomaly to a possible site component.

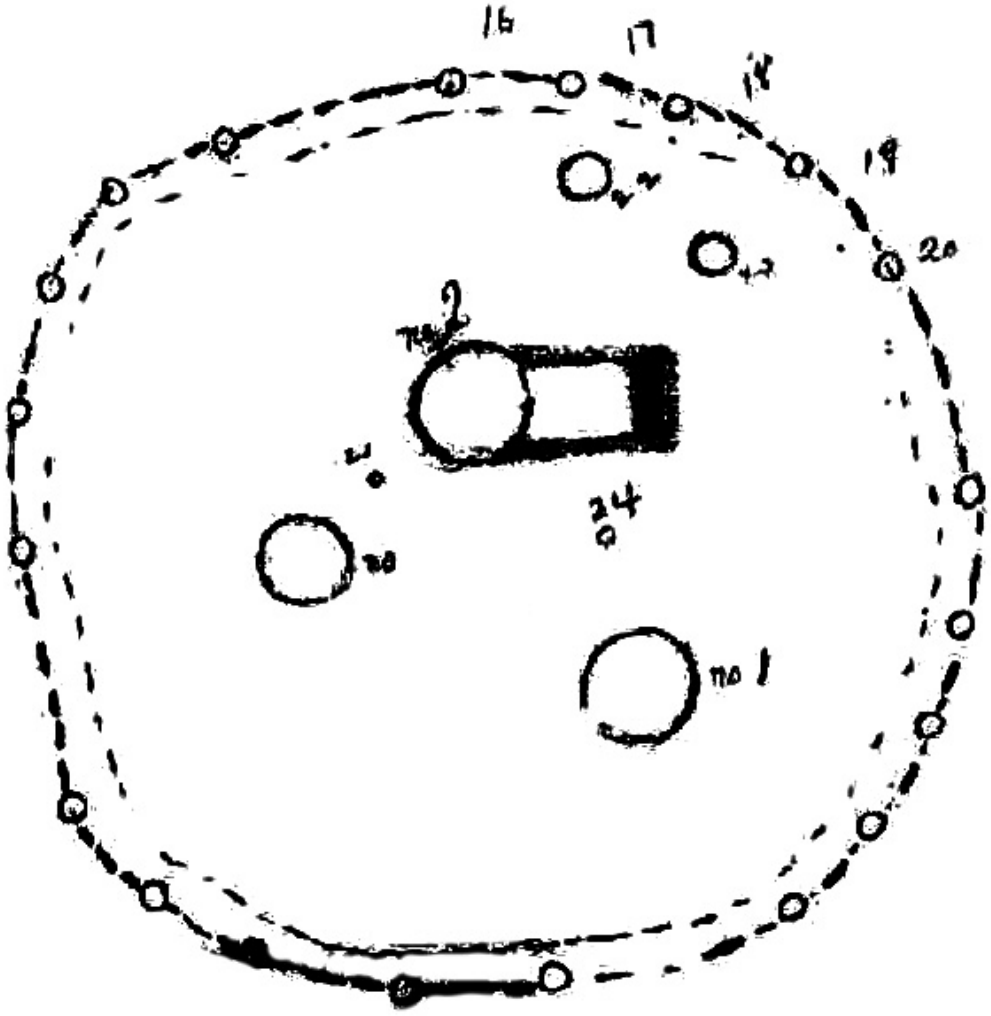

Figure 1. Myer's site map of Castalian Springs.

The geophysical anomaly encountered in the surveys roughly coincides with the "council house" area noted on two of Myer's maps. The current ground surface over the anomaly is mounded approximately 1 m higher than the surrounding area and is conspicuous when compared to the adjacent plaza. Area photographs by Myer in 1916-1917 show the area in cultivation as a cornfield, so the circular wall pattern may well

have been visible on the surface. His early observations provide support that the anomaly was a visible site component at the beginning of the twentieth century and not a modern post-1917 feature (Smith et al. 2009).

The geophysical anomaly's proximity to the location of Myer's "council house" encouraged research on large Southeastern circular buildings. The Apalachee council house at the historic Mission San Luis site provides the best known example of an aboriginal council house and is also the largest documented Native American structure in the Southeast (McEwan 1991; McEwan and Hann 2000). The council house was a pine framed circular structure approximately 36 m in diameter with a 14 m skylight opening in the center. Directly inside the outer wall two rows of posts represent seating platforms raised above smudging pits. The platforms would have been employed as seats during meetings and beds when the lodge housed guests (McEwan and Hann 2000). In contrast to an open roofed council house such as the San Luis structure, the Castalian Springs feature may have been an earth lodge. Earth lodge research lacks continuity in Southeastern archaeology, prohibiting a comprehensive definition and understanding for this architectural form. The Moundville earth lodge in Alabama (Knight 2009; Mirarchi 2009; Sherard 2009; Tickner 2009) and the Macon Plateau Earth Lodge (Fairbanks 1946; Larson 1994) are the two primary structures referenced, but several other possible circular structures are documented in magnetometer datasets including the Ames Plantation (Andrew Mickelson, 2010 personal communication) and Link Farm (David Dye, 2010 personal communication) sites in Tennessee. Also, recent excavations at Mound Mx8 at the Kincaid site in southern Illinois have produced a similar, large circular building that was initially detected through magnetometer survey (Pursell 2007).

The Earth Lodge

To place the Southeastern earth lodges into a North American context, we should ask what constitutes an earth lodge as it was originally intended. Earth lodges are best known from the Great Plains as seasonally occupied, circular, occasionally square, structures with domed single-post construction covered with sod or layers of thatch and soil (Roper and Pauls 2005). This form predominates on the Great Plains especially in the Missouri River Valley as domestic house structures. The classic ethnohistoric examples of Mandan and Hidatsa semi-subterranean earth lodges share physical characteristics with the Southeastern examples, but also differ because Plains earth lodges primarily served as houses (Gardner 1996; Roper and Pauls 2005; Wilson 1934). Also, cultural and religious beliefs are associated with Plains earth lodges (Gardner 1996). For example, Pawnee earth lodges were domiciles with a circular form, typically supported by four central posts and central fire pit that symbolically represented the center of the Pawnee world. Physically aligned to astronomical events and observations, they were related to sacred narratives that formed central elements in a variety of ceremonies. They also served as community council buildings (Gardner 1996; Nabokov and Easton 1989).

The presence of earth lodges east of the Mississippi and the possibility of their ancestral forms being related to other widely distributed circular architectural forms suggests the round form is an ancient and basic cultural feature, as it appears throughout the earliest occupations of North America (Linton 1924). Examples such as the Cherokee "townhouses" and Chickasaw and Choctaw "hot houses" are cited as possible historical examples that highlight the ubiquity of the circular form (Crouch 1974; Linton 1924). This form, serving as a public building, can be found in Benjamin Hawkins and William

Bartram's observations of the Creek employing circular buildings, or *tcokofa*, until the late eighteenth century (Barker 2010; Larson 1994). The ceremonial use of large, paired, rectangular buildings and circular earth lodge style buildings across the Southeast contrasts with the more residential emphasis of the Plains earth lodge.

Structures considered earth lodges in the Southeast are variously defined. The most comprehensive work on Southeast earth lodges is made by Crouch (1974). Three categories of construction types are presented: the earth lodge, a completely earth-covered form; the earth banked structure with only a partial covering of earth; and finally earthen construction, which consolidates the two previous terms (Crouch 1974:2). Rudolph defines these structures as, "an above-ground building that had either an earth-covered roof or an earth embankment buttressing the exterior walls" (1984:33). However, Larson (1994) critiques the combination of two distinct architectural forms into one definition. He considers earth lodge and earth-banked structures as distinct architectural forms. To further complicate the matter, Mirarchi (2009:1) defines any "square or round, earth-embanked structure blanketed with an earthen sheath" as an earth lodge.

Crouch (1974) and Rudolf (1984) postulate that sod-roofed earth lodges are present in the Southeast. However, evidence for sod-covered circular structures from the Southeast is lacking. Larson (1994) suggests they typically possess only an earthen embankment that often occurs as a common feature of both domestic and public structures in the Southeast. A common configuration of earth embankments includes daub-covered walls with pent roofs to provide a seal to the outer surface of the walls providing a functional surface to deflect rain water (Larson 1994).

The two best documented archaeological examples of Southeastern earth lodges are from the Macon Plateau site in Georgia (Fairbanks 1947; Larson 1994) and Moundville site in Alabama (Knight 2009; Mirarchi 2009; Sherard 2009; Tickner 2009). The Macon Plateau earth lodge (Figure 2) was located underneath the approximately 21 m diameter and 1 m high Mound D (Fairbanks 1947). The building was completely exposed, uncovering a massive, steep-banked clay wall that gave a semi-subterranean appearance to the structure's floor (Fairbanks 1946). No posts were found within the clay embankment suggesting the roof rested directly on the upper surface of the wall and was supported with four centrally located posts (Larson 1994). A long banked passageway 0.5 m wide was located at the southwestern quadrant of the structure. The interior of the building was ringed with 47 prepared clay benches. At the center a raised forked-eye raptor effigy is surrounded by three additional seats. The size of the building and the careful arrangement of the prepared clay benches suggest the Macon Earth Lodge was a ritual structure that served both political and religious functions.

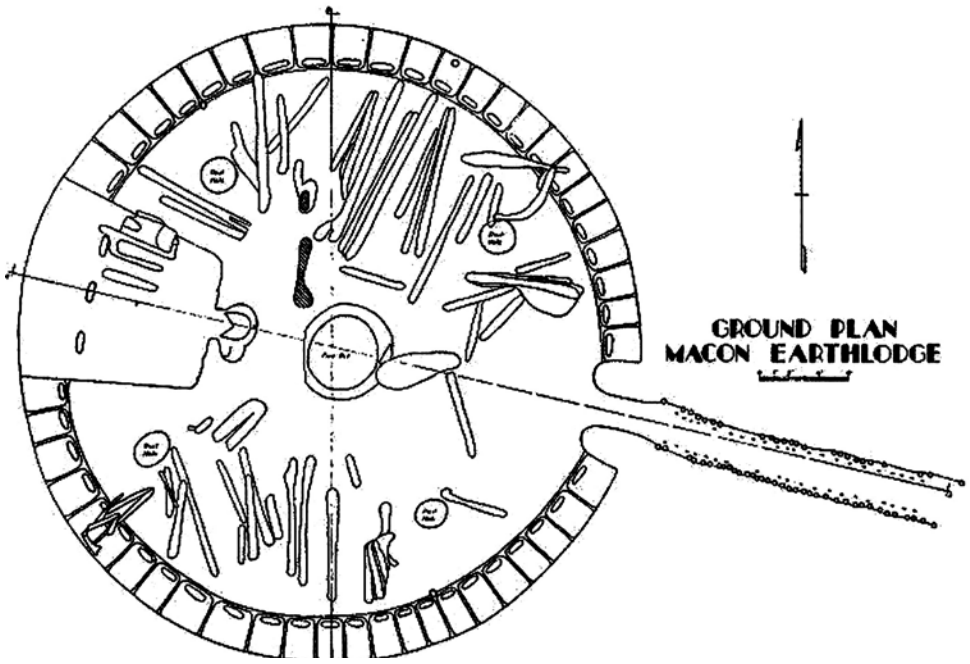

Figure 2. Plan map of the Macon Earthlodge after Fairbanks 1947:96.

The Moundville earth lodge is composed of two superimposed stages, designated Structures 1a and 1b. Structure 1a is 11.1 m in diameter, enclosing an area of approximately 123 m^2. Structure 1b, the second phase, is slightly smaller but follows the same pattern (Knight 2009). The construction is composed of posts and pit features surrounded by an approximately 2.7 m wide embanked berm composed of tan-orange sandy clay of unknown height (Knight 2009) (Figure 3). The outer wall construction for the two building phases consists of two rows of single set posts and a line of small hickory leaner posts at the berm's base, likely serving as a supportive retention wall for the berm and outer covering (Knight 2009; Mirarchi 2009; Tickner 2009). An interior line of larger pine posts, located approximately 20 cm interior to the leaner post line, and approximately 75 cm below the floor's surface, likely functioned as one of the earth lodge's main wall lines; these postholes were spaced approximately 50 cm apart and

averaged 28 cm in diameter and 74 cm deep (Knight 2009; Tickner 2009). The rebuilding phases of these structures suggest that Structure 1a was dismantled and covered with a sterile soil. Structure 1b was burned at the end of its use life. This terminal event, combined with the soil covering, preserved the post, rafters, and other architectural elements including possible clay benches and a vitrified layer atop the beams suggesting evidence of an earthen covering (Tickner 2009). Both stages of Structure 1 were accompanied by a smaller structure connected to the main earth lodge by a passageway. Structures 2a and 2b were not completely excavated, but evidence of a single post construction with prepared clay floors is reported from the second building phase (Knight 2009).

Based on the literature, large buildings in the Southeast occur in various forms with or without an earthen covering, but similar aspects appear in both the Macon and Moundville structures: the earthen embankment or berm, possible clay benches, and the covering of the demolished structure with soil. Across the region, earthen constructions of mainly circular buildings seem to appear frequently. The wide-spread use of the circular form could represent a significant aspect of Native American architecture (Linton 1924) that has previously not been considered as prominent structural forms at the region's Mississippian mound centers.

Understanding why chiefly societies, such as Mississippian, built large public structures is an important anthropological question. As chiefs gain authority, large public buildings generally begin to appear. Public architecture can reflect a centralization of power as chiefs begin to rely on councils to interact with the general population as intermediary officials (Blitz 1993). Conversely, the presence of council houses may

indicate dual leadership systems where the chief and a council of elders made decisions (Blitz 2010; Galloway 1995; Hudson 1976; Muller 1997). Ethnohistorical studies report prominent chiefs, such as the Natchez Suns, conferring with their councils (Hudson 1976), but an understanding of the degree of authority and power councils maintained remains elusive.

Mississippian councils likely maintained significant power in community decision making. The sacred nature of circular building should also be highlighted as public life was interwoven with spiritual life in Mississippian societies as evidenced by ethnographic accounts (Barker 2010; Bartram 1853). Detailing the mechanisms behind chiefly councils is outside the scope of this thesis, but by presenting data from the Castalian Springs circular anomaly I will offer evidence relating the circular building's importance to community life at Castalian Springs.

Chapter 2

Methods

The investigation of the Castalian Springs circular feature employed geophysical survey, controlled excavations, artifact analysis and radiocarbon dating. A battery of geophysical surveys was conducted from 2006 to 2009 before excavation of the circular anomaly began. Initially, test units were excavated to locate the anomaly below ground surface. The 2010 investigations focused on uncovering a comprehensive portion of the feature to sufficiently sample the anomaly in order to understand the extent of remaining architectural elements.

Geophysical Survey

Magnetometry and ground penetrating radar (GPR) were chosen to delineate the site's extent and to pinpoint locations of interest for excavation. These two methods are commonly employed for surveying archaeological sites. Magnetometry is widely used and simple to operate as it uses the earth's magnetic field to detect anomalies (Kvamme 2006). GPR produces a radar signal that is broadcast, reflected back to the device in order to record subsurface features, then employed in selected areas for 3D mapping once a magnetometry survey had been conducted (Conyers 2004).

Magnetometry is considered one of the best geophysical methods to record features at prehistoric sites due to its ability to read subtle changes in a soil's magnetic content. The device reads the variation in a soil's magnetic susceptibility due either to the addition or subtraction of magnetic materials. Two ways this device works is by detecting thermoremanent magnetism that remains after a soil or other material undergoes a firing

event and will also record anomalies exhibiting induced magnetism found in magnetically susceptible material such as iron oxides (Kvamme 2006). Human occupation causes affected soils to become more or less magnetic due to disturbance such as fires, compaction, and soil movement. Magnetic properties are measured by the sum of induced magnetism; thus contrast between a feature and surrounding subsoil must be present to be detected by the instrument (Kvamme 2003). The method's ability to record the prehistoric landscape in great detail through area-wide mapping provides an additional tool other than excavation to understand settlement patterning (Kvamme 2003).

In May 2006, Gerald Schroedl (University of Tennessee) conducted a 6000 m^2 magnetometer survey at Castalian Springs (Figure 3). His survey focused on the southeast section of the site directly north of Highway 25 to provide some possible excavation areas for that year's investigations. Two areas of interest were tested archaeologically, but the unexcavated northern portion of his grid showed a faint circular anomaly.

In March 2009, Chet Walker (Archaeo-Geophysical Consultants, LLC) conducted a second magnetometer survey over a larger area of the site including the platform mound. His dataset was collected using GPS navigation to record the location of the magnetometry data. A second dataset (Figure 4) containing a large circular anomaly south of the central platform mound, had the potential to be the most significant finding. Successful testing caused the focus of the 2010 excavations to shift primarily to the circular anomaly to determine if it coincided with the large circular structure recorded by Myer.

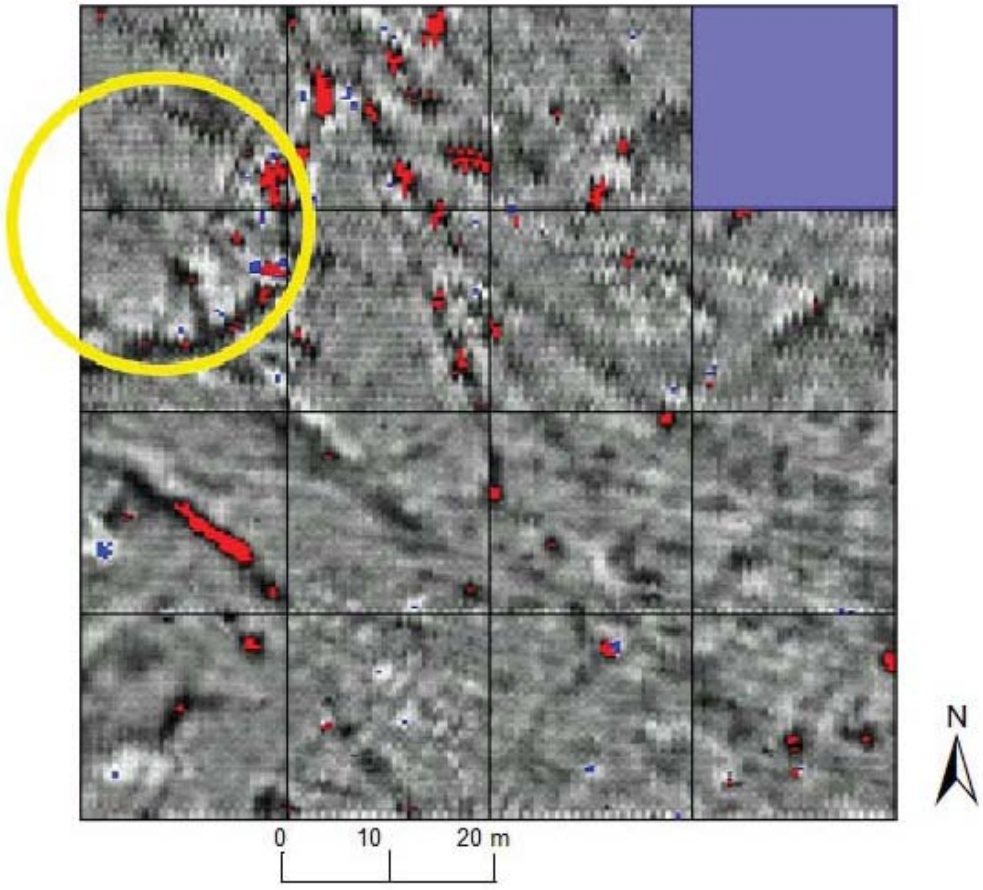

Figure 3. 2006 Magnetometry survey, courtesy of Gerald Schroedl.

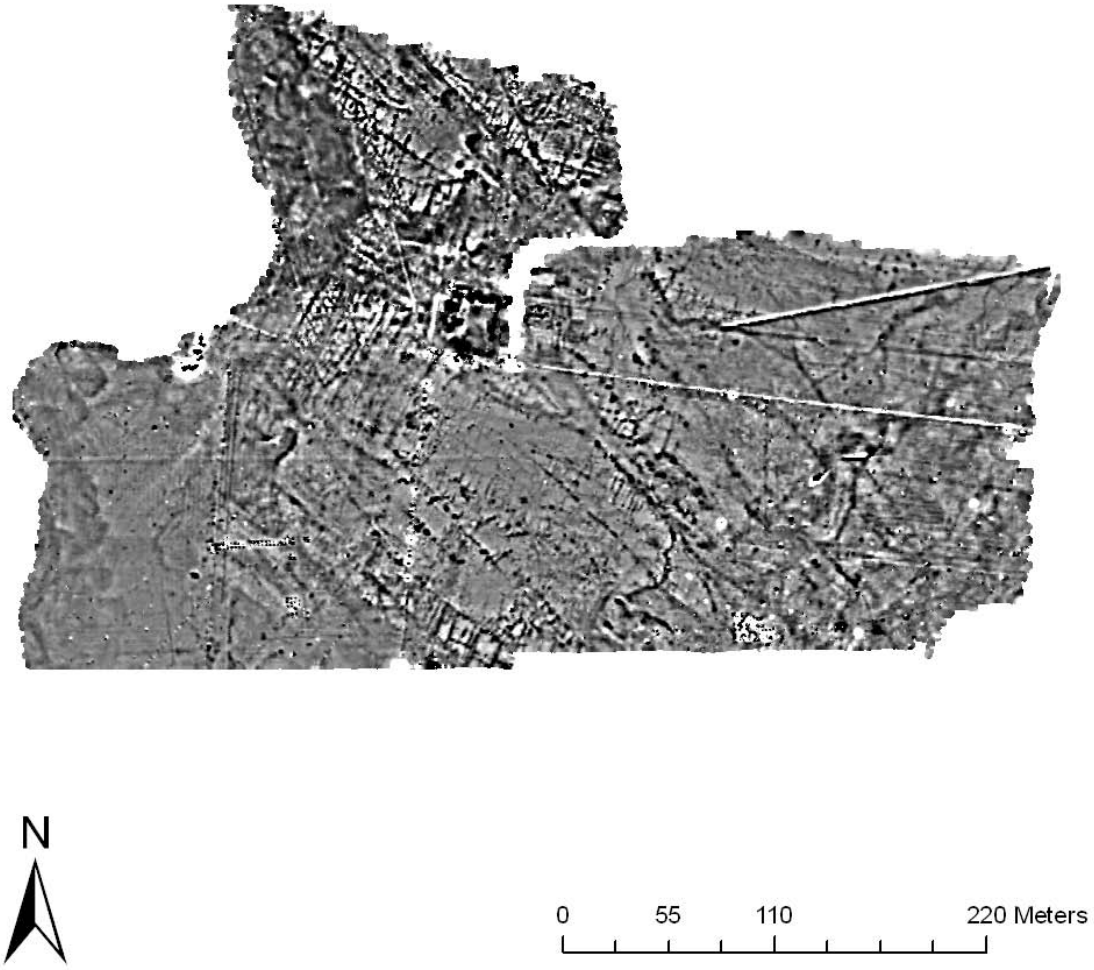

Figure 4. 2009 Magnetometry survey, courtesy of Chester Walker.

Excavations were postponed in the vicinity of the circular anomaly until a GPR test survey block could be completed during Walker and Strum's visit in order to test the effectiveness of the GPR method on the possible feature. Under the supervision of Jennie Sturm, I operated a SSIS (Subsurface Survey Imaging Systems) 400 megahertz GPR sled and data collector (Figure 5). A 20-x-20 m test block was laid out and surveyed over the

location of the circular anomaly. The promising results from the initial test survey were then expanded to a 60-x-60 m block. The data was time sliced in GPR Slice, and then plotted in Surfer to provide images of radar reflection below the surface (Figure 6).

The GPR test produced radar imaging that reflected shallow subsurface penetration less than a meter below the ground surface. A slice from the center of the radar profile is the best evidence we have of GPR reflecting off the circular anomaly. Ground penetrating radar typically provides a 3-D image of subsurface features (Conyers 2004). Unfortunately, the survey did not show distinct images in all the vertical slices, perhaps due to either the survey methodology or the site's particular geological conditions. The GPR imaging reflects shallow subsurface penetration and the upper part of the radar profile is the best evidence for GPR detecting the circular anomaly (Figure 6). The faint recorded image was congruent with the magnetometer data set as can be seen with the magnetometer data overlaid onto the GPR time slice in blue (Figure 6). Ultimately, the GPR survey results were subtle, but the circular anomaly appeared in the same location as indicated by Myer's maps and the Schroedl and Walker magnetometer surveys.

Figure 5. GPR survey in progress.

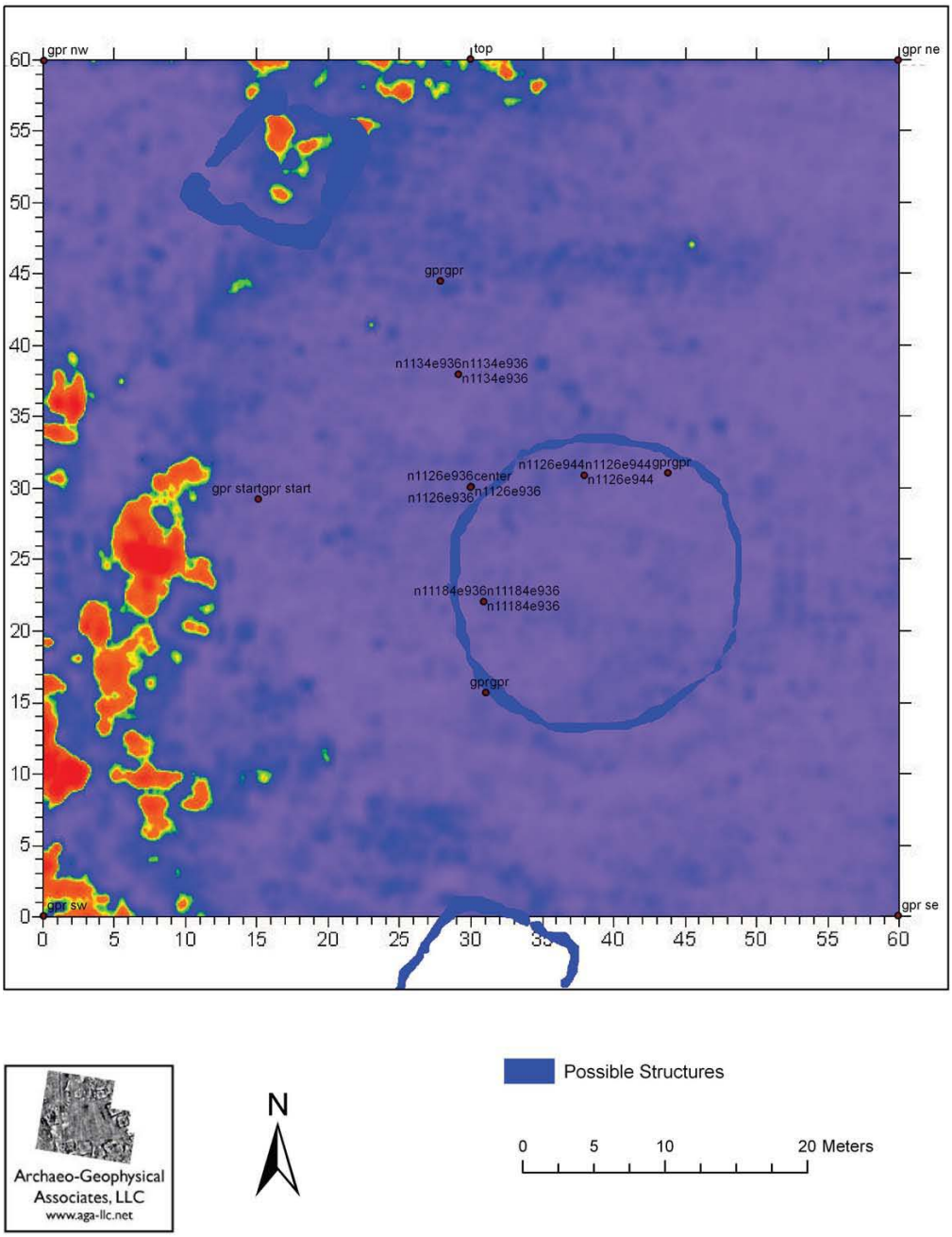

Figure 6. GPR dataset with 2009 magnetometer dataset overlaid in blue courtesy of Chester P. Walker.

Test Excavation Units

Based on the clear magnetic signature, it was anticipated that the remnants of a wall should be readily identifiable. If a continuous circular feature corresponded to the magnetic signature, then excavations could investigate the enclosed area and determine the interior features. Architectural elements such as central support posts, roofing, and inner partitions would be present based on similar-sized structures at Moundville and Macon Plateau.

Due to the independent confirmation of the feature by two geophysical methods, the final week of the 2009 field season focused on excavation of three 2-x-2 m units to test the feature. A portion of a dark semi-circular stain was exposed (Figure 7). The excavations show three distinct zones of variously colored and compacted soils and sediments similar to the Moundville earth lodge (Mirarchi 2009).

The sediment of the intermediate zone is more compact and grades into a thin zone that could represent post features. Relatively non-organic sandy loam sediment separates the anthropogenic feature soil from the natural soil on the west edge of the test unit. The soil in the western portion of the test area (i.e., outside the feature) is also typical of natural soil formation at Castalian Springs. The eastern portion of the test unit exhibits a dark, organic-rich stain with carbon inclusions typical of anthropogenic soil (Smith et al. 2009). The possibility of an earthen berm evidenced by the initial appearance of a soil zone separating the undisturbed soils and the possible interior fill strengthened the comparison to the Moundville earth lodge as it also possesses a similar zone (Mirarchi 2009).

Figure 7. 2009 test excavations.

Excavations

The 2010 field school began by uncovering the circular feature located in the 2009 testing program. Excavations assumed the form of a linear block originating from the 2009 test units across the location of the magnetic anomaly with multiple, contiguous 2-x-2 m excavation units that bisected the structure. Discontinuous excavation has proven to be ineffective at Castalian Springs due to the difficulty distinguishing feature fill and surrounding sediments in previously excavated Mississippian structures without ample areal exposure through excavation. Initially, the units were excavated approximately 20-24 cm below the ground surface, however features were still difficult to see at this depth.

Once the eastern wall trench was located, the building's center was extrapolated at about 10.1 m from each of the uncovered wall trench segments. Units were then placed directly over the estimated location of the building's outer wall directly to the north and south of the estimated center of the building revealing similar wall trench segments. After effectively uncovering four segments of the wall trench, excavations were then expanded at the center of the structure to increase an understanding of the building's interior. Two additional units, one 2-x-2 m unit and one 2-x-1 m, were placed to the north of the western wall trench segment. Following the wall trench allowed a better assessment of the wall's exterior. A 4-x-4 m block of units was placed southwest from the center of the building to follow the outer wall trench and locate any other architectural features. The plan of the excavation area (Figure 8) showed us convincing evidence of a continuous feature that was a substantial construction.

Artifact and Sample Collection

Artifact collection protocol followed the standards established by the Castalian Springs Archaeological Project over the past five field schools. The excavated soils from each level were processed with ¼-inch screen to recover artifacts. As excavations were expanded the plow zone in some cases was excavated as a single level. Fill was discarded because the plowzone's artifact density had been previously established and no additional information concerning the building would be achieved by further sampling the plowzone. The majority of smaller features were excavated and the fill was collected in a soil sample. Large features were excavated in levels and the fill screened and/or collected as soil samples. Incidental limestone debris was measured by volume and discarded

except in cases where rocks were in contact with features. Carbon samples were collected *in situ* when possible, but screen collection of carbon materials also occurred.

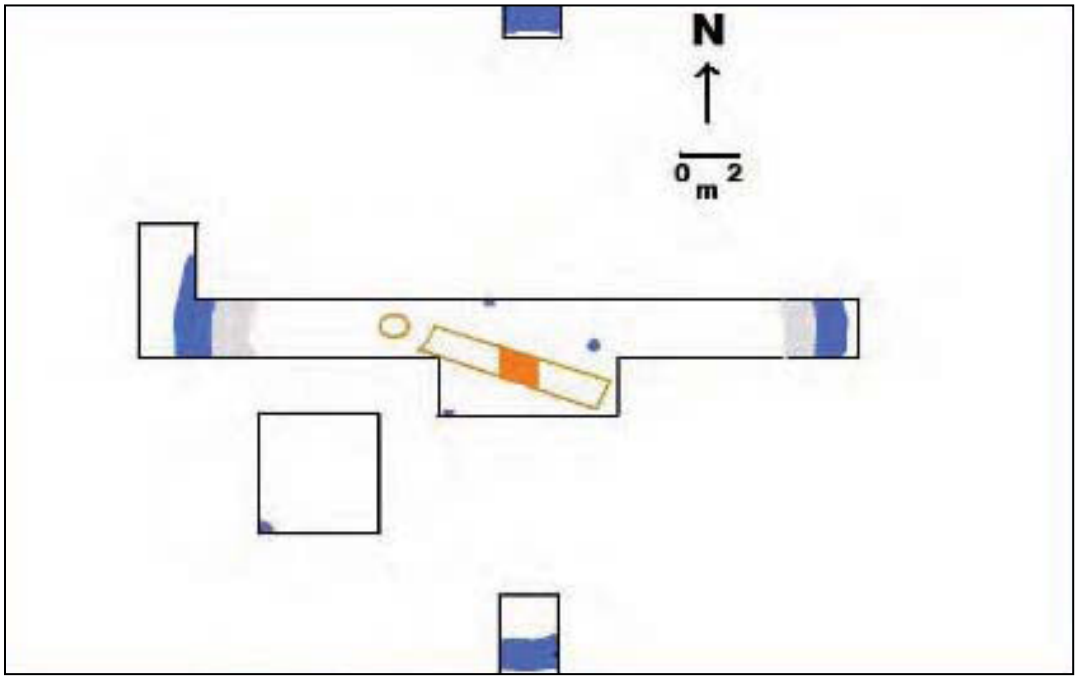

Figure 8. Plan view of 2010 excavations.

Chapter 3

Results

The 2010 excavations at Castalian Springs uncovered the architectural remains of a large circular structure that included an outer wall trench and interior and post-demolition features. Carbon materials were used for three radiocarbon dates from the outer wall trench and a large centrally located feature. Artifacts from the outer wall trench provided a sample of the small range and density of artifacts present in the structure.

Architectural Elements of the Outer Wall

A 50-x-140 cm exploratory cross section was placed over the western trench segment to determine the nature of the feature. The completed wall trench profile showed evidence of a stepped excavation measuring approximately 1m in width and extending as deep as 1.2 m below surface level (Figure 9). The cross section of the wall trench at this location exhibits a profile perhaps resulting from a single construction episode consisting of a homogenous fill (Figure 10). The trench segment measures 1 m in width and extended 1.2 m below ground surface composed of three apparently contemporaneous steps increasing in depth from the exterior to the interior. The exterior step contained preserved post fragments. However, only faint evidence of extracted wall posts was visible at the lower two steps. The northern and southern uncovered portions of the wall trench were also cross sectioned and showed a similar “three-stepped” profile, although they were truncated by bedrock (Figure 11).

Figure 9. West wall trench segment profile facing north.

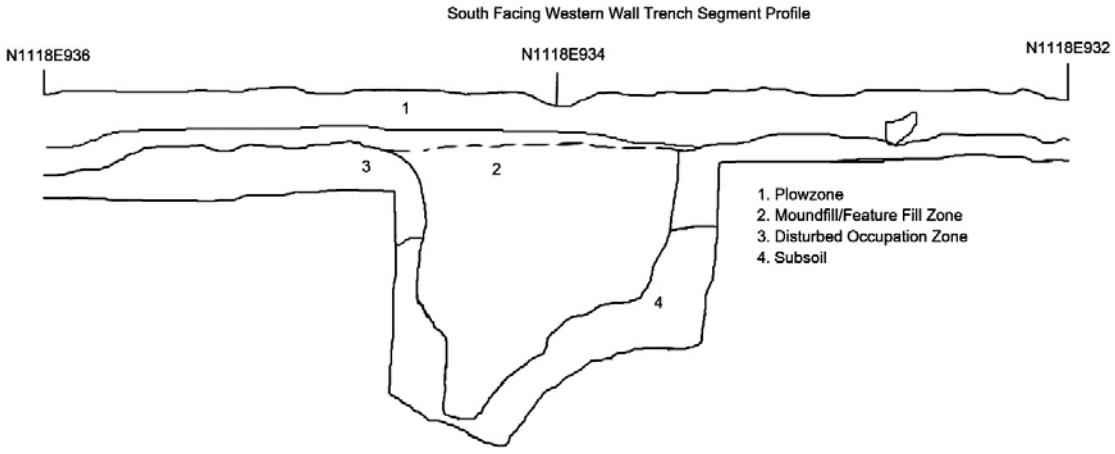

Figure 10. South facing western wall trench segment profile.

Figure 11. Southern wall trench segment facing west.

The wall segment to the east was excavated in levels to closely examine the steps shown in the first wall segment profile to the west. The remnants of small carbonized posts were identifiable only in the shallowest outer step (Figure 12). As excavation proceeded, the three steps were distinctly visible, including the consistent lip between the inner and center steps (Figure 13).

Figure 12. Eastern wall trench segment showing posts in outer step.

At the base of the wide center step, impressions of four large postmolds were visible. The inner and deepest step exhibited no signs of postholes or molds. While the possibility exists that the three steps could represent rebuilding episodes, two lines of evidence suggest this is not the case. First, the fill in the lower portions of the three trenches is homogenous and does not in profile (Figure 14) suggest decay or reconstruction. Second, the design of the three steps is entirely consistent in all four excavated sections, including an upturned lip between the inner and central steps without any observed overlapping. The significantly different sizes and spacing of the posts in the exterior and center 'steps' also suggest that they are different architectural elements rather than the rebuilding of a similar structure on the same location. However, if these trenches are rebuilding episodes, it would appear that the structure was enlarged each time as post remains were only intact in the outer step.

Figure 13. Eastern wall trench segment showing the base of the central step.

The wall trench exterior also revealed an earth embankment in profile. Posts in the outermost step were left in place suggesting they were not readily accessible for removal. In concert with other evidence, the wall trench profile may indicate the presence of an earthen embankment against the exterior of the wall where the post fragments remained intact (Figure 15). The earthen bank or berm possibly was a major supporting element of the structure and these posts may have been intended to keep the bank away from the main support posts located in the deeper sections of the wall trench.

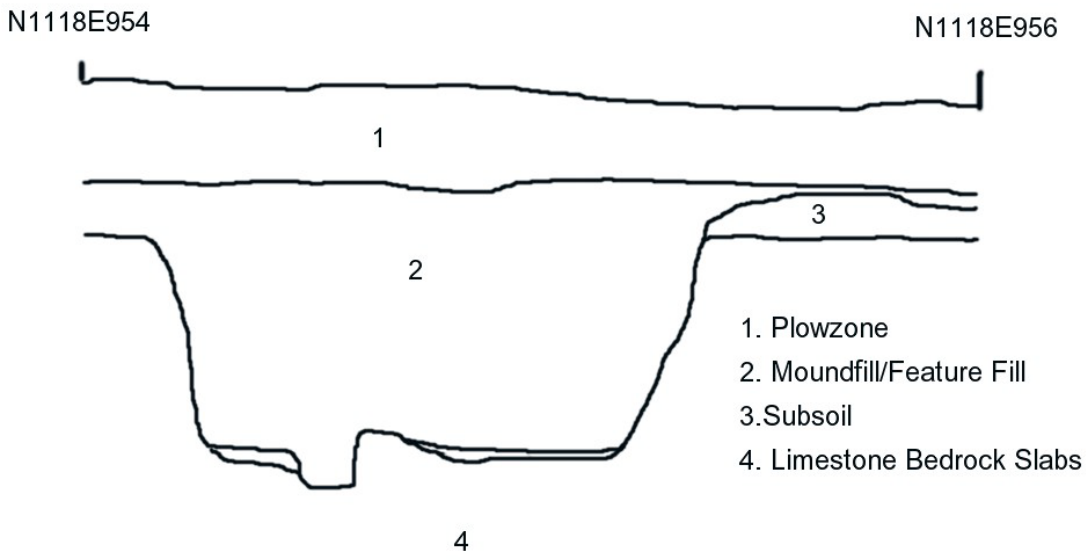

Figure 14. North facing eastern wall trench profile.

Profiles of the exterior to interior of the structure walls provide further supporting evidence of the building construction stages through the stratigraphic layering of the three main soil zones: a plow zone, mound fill zone, and basal zone containing structural remains. A south-facing profile (Figure 16) on the western side of the structure illustrates mounding of a sterile fill over the structural remains. This mounded fill is as much as 40 cm thick over the center of the structure, tapering off at the periphery and was most likely carried in through basket loaded soils resulting in a distinctive overlapping variation of soil colors. A number of interior pits and posts clearly originate beneath this "mound fill" at the base of the profiles.

Figure 15. Possible embankment associated with the northern wall trench segment

Figure 16. South facing profile directly interior of the western wall trench segment.

Interior Architectural Elements

The interior architectural elements were carefully examined for signs of collapsed wall and roof remains. No substantial evidence of roof timbers or support beams was identified, however, near the center of the excavations was one remnant of carbonized cane matting, possibly related to a smoke hole (Figure 17). Several interior pits and small posts were documented throughout the interior of the wall trench. Interpretation of interior features is limited due to the small area excavated within the large interior of the structure and the apparent removal of most accessible architectural elements. The suggestion that the structure was dismantled and revisited is compounded by the center being largely obscured by possible post-demolition activities. Further examination of the origin, diameter, and post depths may reveal some patterning in the architecture near the center of the structure.

Figure 17. Possible cane matting or thatch found at center of structure.

The data recovered from the 2010 excavations currently provide three general observations. First, most of the interior features are clustered along the exterior walls or at the center of the structure. Second, few of the apparent posts are large enough to represent significant structural elements. The remains of three large (30-40 cm) ramped posts may represent load-bearing elements of the structure (Figure 18), but these features were not fully excavated and understood at the conclusion of excavations in 2010. Third, the post diameter and depth suggest possible partitions, screens, or similar non-load-bearing elements that may have surrounded the center of the structure.

Figure 18. Ramped post located in the interior of the circular structure.

Central and Post-Demolition Features

Significant features also clearly originate in and above the overlying "mound fill." This complex of features is concentrated in the center of the structure and represents an apparent return to the structure at some point after it was deconstructed and buried. At the time of excavation two main features, Feature 233, represented by the yellow rectangle, and Feature 173, the blue circle, represents the location of the first two skulls discovered within the structure were located but were difficult to interpret (Figure 19). Concentrated at the exact center of the structure, these features were initially considered to have been post-demolition in origin due to their location at or just below the base of the plowzone and because they penetrate the overlaying mound fill.

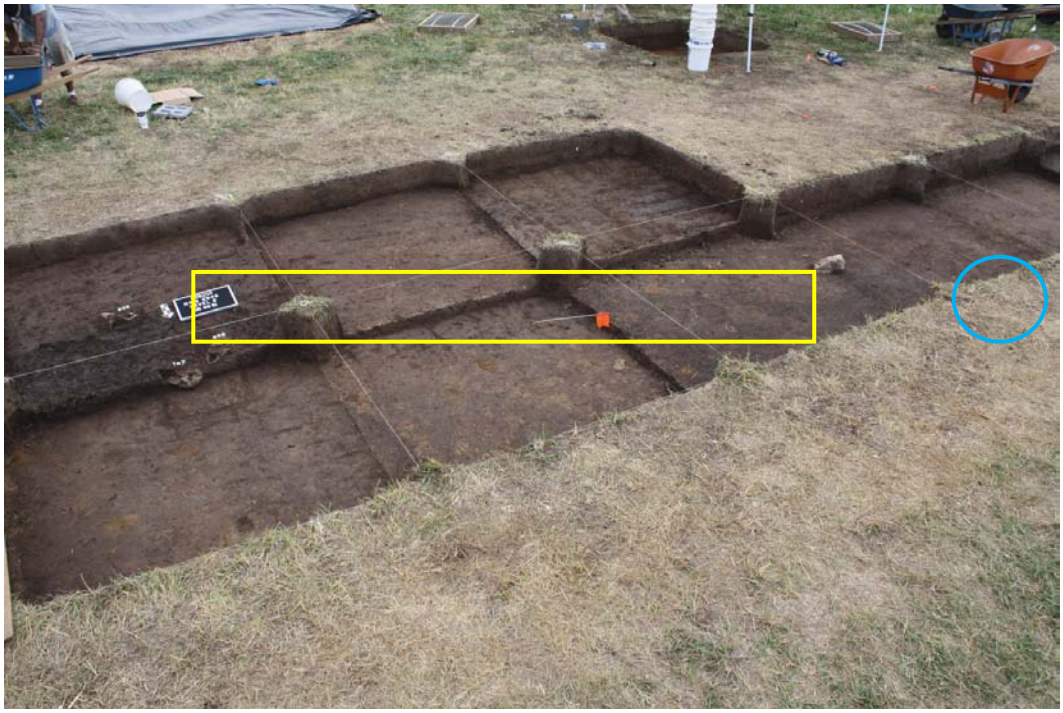

Figure 19. South facing photograph of the post demolition features.

Most notable among the elements of these features is the placement of human skulls on top and within the two post-demolition features. No human skeletal elements, other than crania, mandibles, and associated first vertebrae, were recovered within the structure or features that might indicate the presence of burials. The excavation of these isolated skeletal elements was completed in compliance with Tennessee State law in consultation with the Division of Archaeology and reinterred within the structure after the conclusion of excavations.

A circular pit at the western edge of the trench originated at the base of the plowzone and contained the first two skulls. At the same elevation to the east of the structure's center, five additional skulls were located at the southeastern end of an intrusive pit. The diagonal trench crosses the precise center of the circular structure obscuring any contemporaneous features (Figure 20).

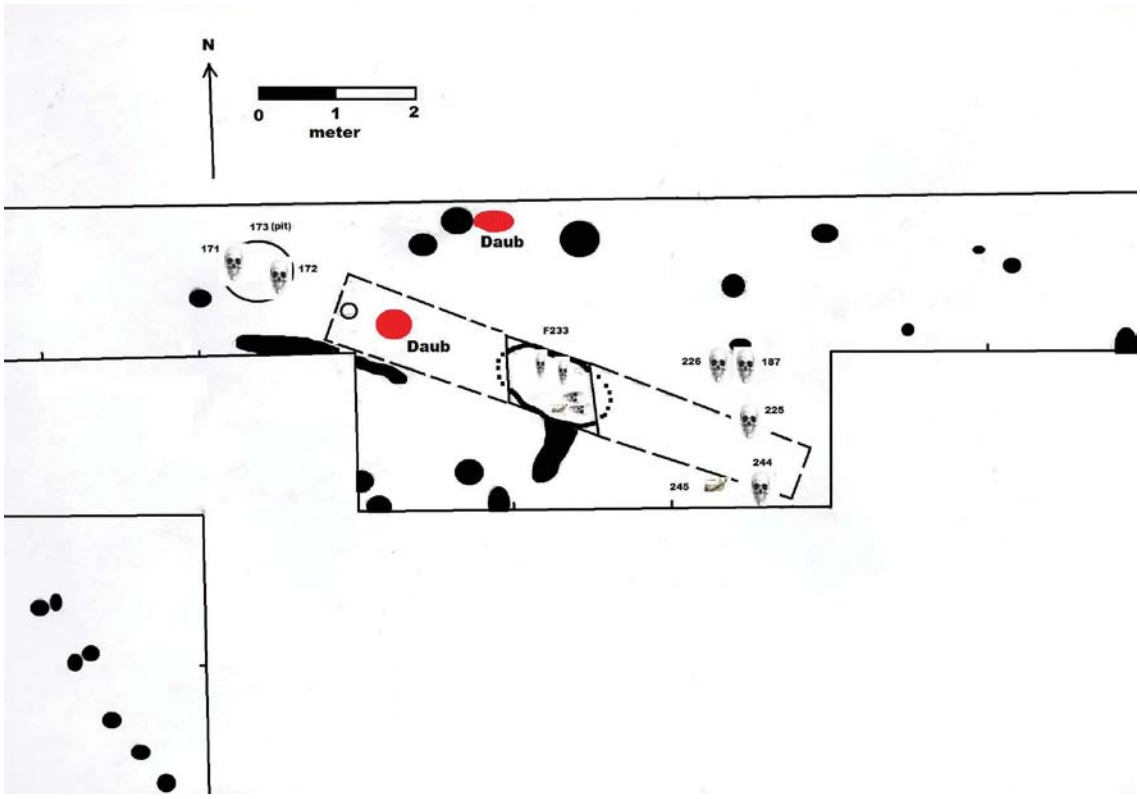

Figure 20. Plan view of circular structure's center, courtesy of Kevin E. Smith.

To gain some additional information on the nature of Feature 233, a 1-m wide cross-section was excavated directly across its center. The feature appears to have been hand-excavated using simple digging sticks, evident from long amorphous gouges at the edge of the trench. The fill consisted of a homogeneous deposit of midden evident in the cross-section. It extended to a depth of 2.1 m at the base. The midden contained four additional human skulls. At its origin the feature presented itself as an amorphous rectangle angled on a northwest-southeast trend from the center of the structure. Near the base a distinct circular shape is seen in contrast to the rectangular plan at the origin. The base appears to conform to what might be expected of a large post, suggesting the structure included a central supporting post (Figure 21) that was removed when the building was disassembled. The unexcavated portions of each side of the excavated section of Feature 233 might be insertion/extraction ramps. Future excavations could provide confirmation whether Feature 233 was in fact a central post.

Figure 21. Rounded base of the cross sectioned Feature 233.

Geophysical Results of Excavated Features

Excavations demonstrate that the magnetometer effectively recorded the general outline of the wall trench remains at each tested location of the exterior wall trench. The unique nature of the wall trench appears to cause the magnetic anomaly. Thus, the high magnetic visibility of the wall trench possibly results from two interacting geophysical features: 1) a contrast created by the trench fill extending deep into surrounding dense subsoil clay; and 2) the accumulation of a dense layer of precipitated minerals (ca. 1-3 cm thick) at the base of the deepest part of the trench (Figure 23). Although samples have not been examined for their content, the latter soil layer appears to include significant amounts of precipitated iron oxides at the profile base. A metal detector identified a magnetic signature within the profile that is believed to correlate with the rust brown-colored substance. This precipitate seems to form in features at the site that extend into the impermeable subsoil clays greater than 1 m in depth. The formation of this precipitate may be related to the high mineral content of soils enhanced by the presence of numerous mineral springs at and adjacent to the site.

Figure 22. Orange colored precipitates at base of a wall trench segment.

Radiocarbon Results

To address the age of the structure, carbon samples from the outer wall trench and central feature were submitted for AMS dating. The three dates overlap considerably suggesting the most likely construction date of the circular structure was between approximately cal A.D. 1310-1330 (Table 1). Given the lack of evidence for renovation or rebuilding of the circular structure, we presume that it was in use for some 15-20 years, after which it was carefully dismantled and buried beneath a small mound.

The lack of overlapping architectural elements also suggests there was only one construction episode. A short time after the demolition, portions of the interior were re-visited for the interment of a complex tableau of human skulls. Conservatively, all these events appear to have taken place between cal A.D. 1290 and 1350. This placement is consistent with other recent dates from mound construction at Castalian Springs that suggests that the primary platform mound, Mound 2, was quickly constructed, between about cal A.D. 1300 and 1340.

Table 1. Results of AMS Dating of Circular Structure Components

Project Sample Number	Beta Sample Number	Material	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age	2σ cal age range*
CSAP 10-2-226	282037	Outer Rings-Wooden Post	610 ±40	-26.6	580 ±40	AD 1297-1373 AD 1377-1422
CSAP 10-2-230	283152	Wood	650 ±40	-26.6	620 ± 40	AD 1288-1405
CSAP 10-2-282	283152	Wooden Post	710 ±40	-25.4	700 ± 40	AD 1229-1231 AD 1240-1247 AD 251-1321 AD 1349-1391

*Calibrations following Reimer et al. (2004)

Summary of Wall Trench Artifacts

The recovered artifacts from 2010 excavations were minimal. Materials excavated, besides the few intact post fragments within the structural feature, include a small sample of lithic debris, almost entirely chert; fragmented pottery sherds; and a limited amount of burned clay, possibly from the building's outer construction. The artifact content of the four wall trench segments is extremely low but represents the majority of artifacts excavated from within the structure (Table 2).

Small mica flakes were found associated with one of the three intact posts, an inclusion associated with other construction posts (Figure 25) at Castalian Springs. However, none of these artifacts provide diagnostic items for relative dating. The artifact density of the structural remains is so sparse it may represent intentional removal of refuse highlighting either the sacred or public importance of the building. The few

remaining posts perhaps correspond to vestigial structural elements that were not removed, and the small quantity of artifacts screened from the fill seems to signify incidental deposition rather than intentional placement. The intentional inclusion of imported mica associated with a post is a clue into the symbolic nature of the structure. This fact, in combination with the only other intentionally placed objects being the human skull elements at the structure center, supports the structure's role as a sacred place.

Figure 23. Mica flake associated with outer wall post.

Table 2. Artifacts from Outer Wall Trench Segments

Artifacts Counts		Artifact by Weight	
Lithic Debitage	498	Post Fragments	2415.52
Blocky Debris	66	Miscellaneous Rock	893.86
Tools	3		
Plain Shell tempered sherds	166		
P lain Shell tempered sherdlets	70		
Bone (small Fragments)	20		
Fired Clay(small >1cm)	41		
Mica (small >1cm)	6		

Chapter 4

Analysis and Discussion

The archeological and geophysical investigations of architectural elements suggest the Castalian Springs structure was built in one episode, used for perhaps a maximum of 20 years, and then carefully dismantled. Regardless of whether the structure was roofed or not, a complete dismantling of the innermost segments of the outer wall seems the most plausible explanation for the observed fill. The outer wall elements enclosed an area of approximately 320 m and are thought to be continuous due to the four wall segments found at each cardinal direction. The wall trench itself appears to result from one building episode. The cross-sectioned profiles share a similar pattern of a three-tiered step, increasing in depth inward, and a consistent lip separating the middle and deepest inner steps.

The composition of the Castalian Springs structure and the post-demolition events are at first glance unique to the site. Nevertheless, architectural similarities can be seen across the region. Earthen construction, centrally placed support posts, and hearth features are variably found in circular structures. To demonstrate the possible function and meaning of public structures, ethnographic accounts and iconographic motifs are referenced for comparisons.

Regional Comparisons

The Castalian Springs circular structure provides evidence of a large building, but to fully understand its architecture, a regional perspective examining other structures should be employed (Figure 24). The main structural support of the Mission San Luis

council house was located near the outer wall, as the center of the structure was an open sky light (McEwan 1991). At Castalian Springs, the circular structure does seem to have a concentration of posts near the exterior wall.

The Castalian Springs structure might contain smudge pit/hearth features similar to those found at Mission San Luis (McEwan 1991) as evidenced by a hearth-like feature along the inside of the outer wall (Figure 9). A centrally located hearth was another main component of the Apalachee council house (McEwan 1991). The center of the Castalian Springs structure does not provide direct evidence of a central fire hearth perhaps due to post-demolition removal and reworking of soils at the center of the structure. So, at this time it is unknown if a central hearth was located within the structure.

The circular Macon Plateau earthlodge was approximately 21 m in diameter and surrounded by a steep earth embankment, giving the appearance that it was semi-subterranean. Similar to the Castalian Springs structure the Macon earthlodge was covered with a low earth mound at the end of its use. The Moundville Earth lodge, unlike the Castalian Springs structure, possesses a square plan instead of circular, but the interior was also surrounded by an embanked berm measuring approximately 2.7 m in width (Knight 2009). Both earth lodges share a similar earth embankment that is also a possible feature of the Castalian Springs structure. On the other hand, while there is evidence of an earthen roof covering at Moundville, no similar evidence was noted in the Castalian Springs excavations. The consideration offered by Larson (1994) that earthlodge and earth-banked structures are distinct architectural forms, supports the idea that earth embankments were shared elements in certain Southeastern structures. The outer wall of the Castalian Springs structure, like the two earth lodge examples, appears

to have been earth embanked. No evidence of an earthen covering was detected in the excavations; thus, as this structure possesses an earth embankment it should not be considered an earthlodge as much as it is an earth-banked structure.

The structure on the summit of the Kincaid Mound 8 provides another comparable architectural example for the Castalian Springs structure, including a circular plan of similar diameter, a deep outer wall trench, and a large centrally located support post with insertion/extraction ramps (Pursell 2007). The presence of a central post within the Mound 8 circular structure provides support that our large central feature is also a central post. The radiocarbon samples from the Kincaid structure provide dates from the fourteenth century (Paul Welch, personal communication) similar to dates from the Castalian Springs structure. However, the current interpretation of the Kincaid structure is that it was rebuilt several times, thus it was in use for a longer period of time (Pursell 2007). A final example of circular construction comes from Cahokia. Several large circles of post were excavated in 1960 during a highway salvage project that represent several possible rebuilding episodes of a large structure 15 m to 23 m in diameter (Wittry and Vogel 1962).

The lack of comprehensive definition prohibits a full understanding of large circular structures and earth lodges across the region, however the similarities of the three similar large buildings at these major mound centers and the prevalence of circular council houses at historic villages points to the possibility that some basic architectural form was being followed for public buildings at Mississippian sites. In the Southeast, seating in circular earthen construction often was located near the outer wall. Use of archaeo-geophysical survey will perhaps aid in the location of similar structures,

increasing the understanding of this architectural form across the region. Magnetometer surveys conducted at the Link Farm, Mound Bottom, and Ames Plantation sites have recently shown similar anomalies that possibly indicate other undetected circular structures at mound centers.

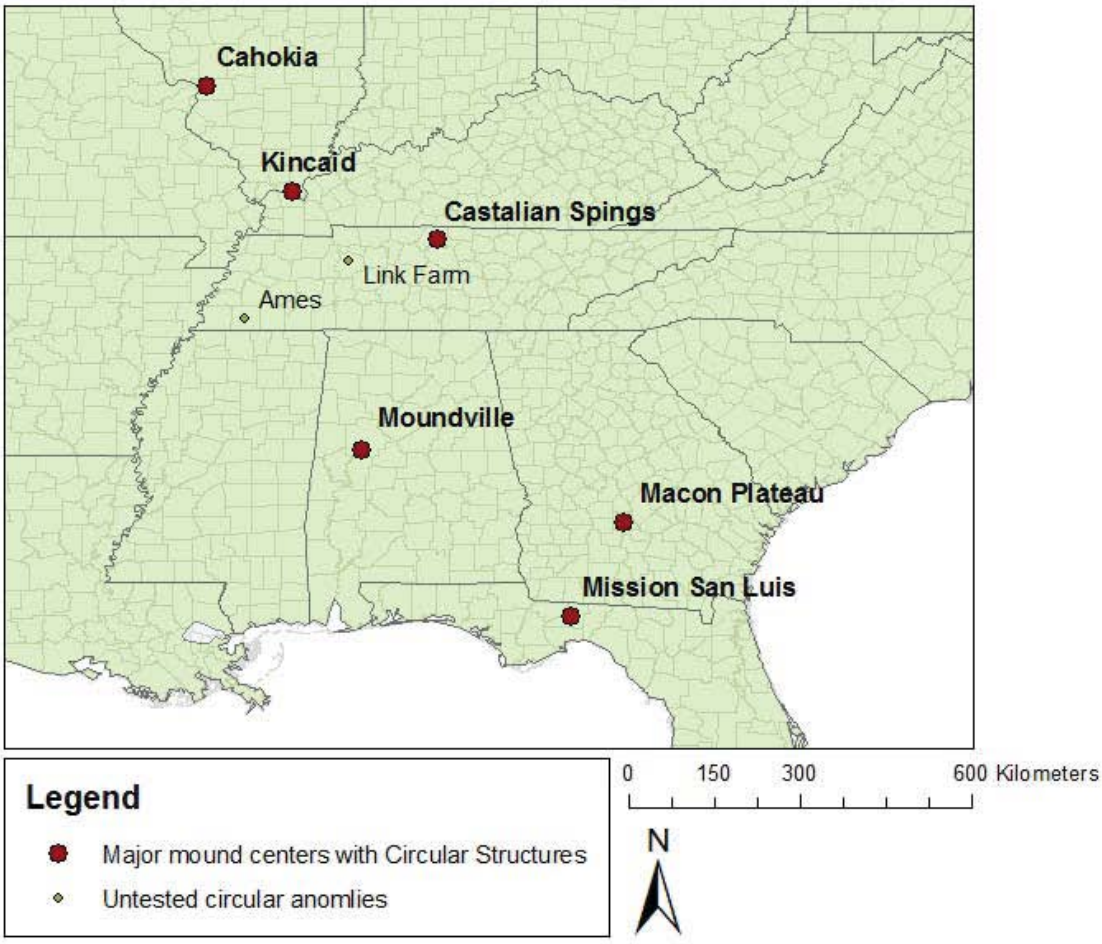

Figure 24. Southeastern mound centers with circular structures.

The addition of isolated human remains at the center of the Castalian Springs building is unique among Mississippian mound centers, and while it is not possible to say exactly why this arrangement was placed at the location, the behavior of arranging human remains is seen in other specialized internments at major Mississippian sites such as Mound 72 at Cahokia (Brown 2003) and the Great Mortuary at Spiro in Oklahoma (Brown 2010). Similarly, the Moundville earthlodge was revisited after the deconstruction of the structure as evidenced by an intrusive interment that includes roofing material and an inverted ceramic vessel associated with a central support post (Mirarchi 2009; V. James Knight, 2010 personal communication). The Crenshaw Site in Arkansas is the only other comparable example of a ceremonial feature consisting of multiple human skulls at a late prehistoric Southeastern site where two clusters of approximately 200 skulls were uncovered in a plaza area (Schambach 1996).

Ethnographic Comparisons

Ethnographic sources provide various examples of public buildings and circular buildings from the Southeast. The historic reports of public spaces, such as council houses and square-grounds, inform us about the native belief system and provide some understanding of the regionally similar yet dissimilar architectural forms that are not available in the archaeological record. Although it is not possible to use these accounts to provide definitive interpretations of the excavated public structures, certain details suggest some basic correlations between the eighteenth century Creek and Cherokee and the Middle Cumberland Castalian Springs structure.

William Bartram's accounts of Creek winter council house, or *tcokofa*, describe round, centrally supported structures located adjacent to square-grounds (Figure 25). They were reported to contain spiral-shaped sacred fires opposed to square arrangement of logs of the square-ground fire pit (Barker 2010; Bartram 1853). The circular form and central supports of the winter council houses were imbued with sanctified connotations. Barker (2010) relates the concentric architectural pattern of the *tcokofa* to the triskele form of marine shell gorgets. The central volutes possibly symbolize the spiral shaped central hearth. The central circle and the enclosing ophidian band represent support posts, with the outer band of ellipses standing in for the outer supports or possibly representing the clan bed platform (Barker 2010). The circular form possibly possesses a cosmological significance similar to the representational world view found in the Cox mound style (Lankford 2007) but representing other significant symbolic motifs related to the spiral.

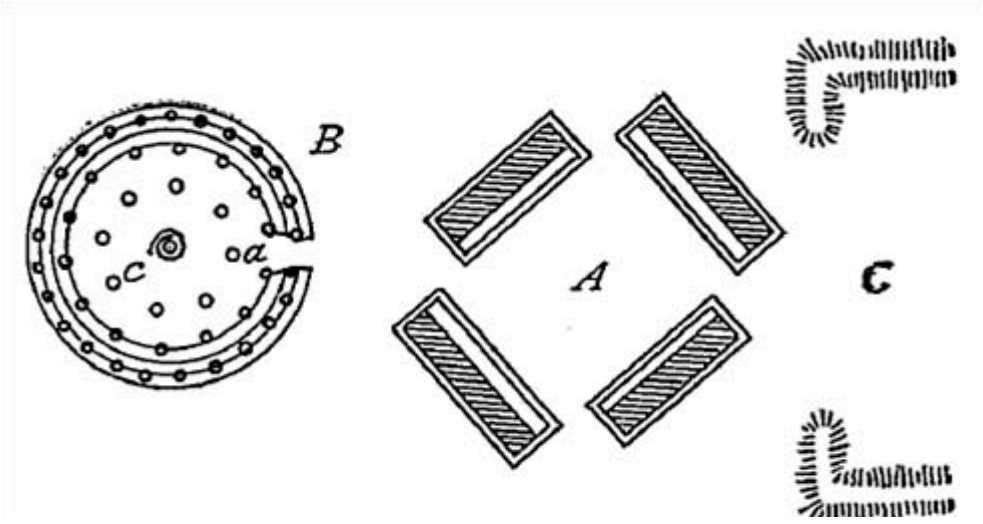

Figure 25. Illustrated plan view of tcokofa and square-ground, after Bartram 1853.

The configuration of the square-ground and rotundas from historic accounts also provide examples of circular buildings being included in public architecture. Swanton (1928) provides plan views of Creek square-grounds (Figure 26) with the rotunda usually placed in the northwest corner of the plaza, but one illustration places the rotunda in the northeast corner of the village plan similar to the placement of the Castalian Springs structure (Figure 27).

Pawnee earth lodges had symbolic orientations and clan and cult affiliations associated with certain locations along the inside of the earth lodge periphery (Gartner 1996). While the Pawnees had their specific meanings and orientations, similarities are seen between the Pawnee earth lodge layout of astronomical sighting lines and the Macon earth lodge plan view pointing to the possibility that the Macon earth lodge conceivably possessed some meaningful astronomical or topographical alignments to the Ocmulgee (Gartner 1996). The Macon Earth Lodge is shown to exhibit two integral plan alignments; a central plan of a circular fire place located within an 5.5 m^2 marked by four main posts aligned to the inter-cardinal directions; and a 20 m axis which the raised clay raptor platform is aligned at 12° 45' south of east (Fairbanks 1946:97 in Gartner 1996).

Clay bench-like features are seen at both the Macon (Fairbanks 1947) and Moundville (Mirarchi 2009) structures, and possibly represent the seats of council members or clan leaders similarly to the known arrangements of Pawnee earth lodges (Gartner 1996). The Castalian Springs structure interior was not fully excavated and only minimal evidence of a similar type clay feature was excavated preventing us from understating any large-scale seating arrangement in this structure.

Initial comparisons between the ethnographic and archaeological record provide the basis for further research into the symbolic importance and function of circular structures across the region. An underlying symbology connected to the circular form and spatial orientations are consistent themes and ethnographic studies can contribute to the problem of interpreting circular public structures.

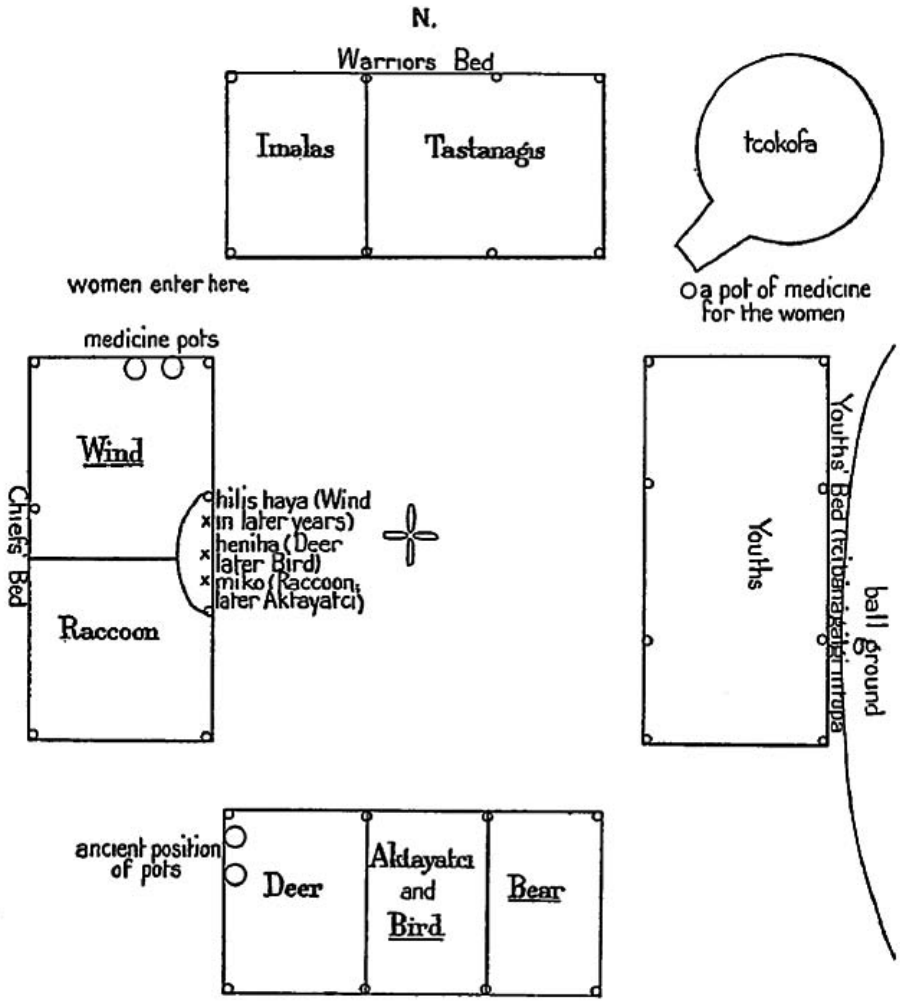

Figure 26. Square-ground plan view with tcokofa northeast of plaza, after Swanton 1928.

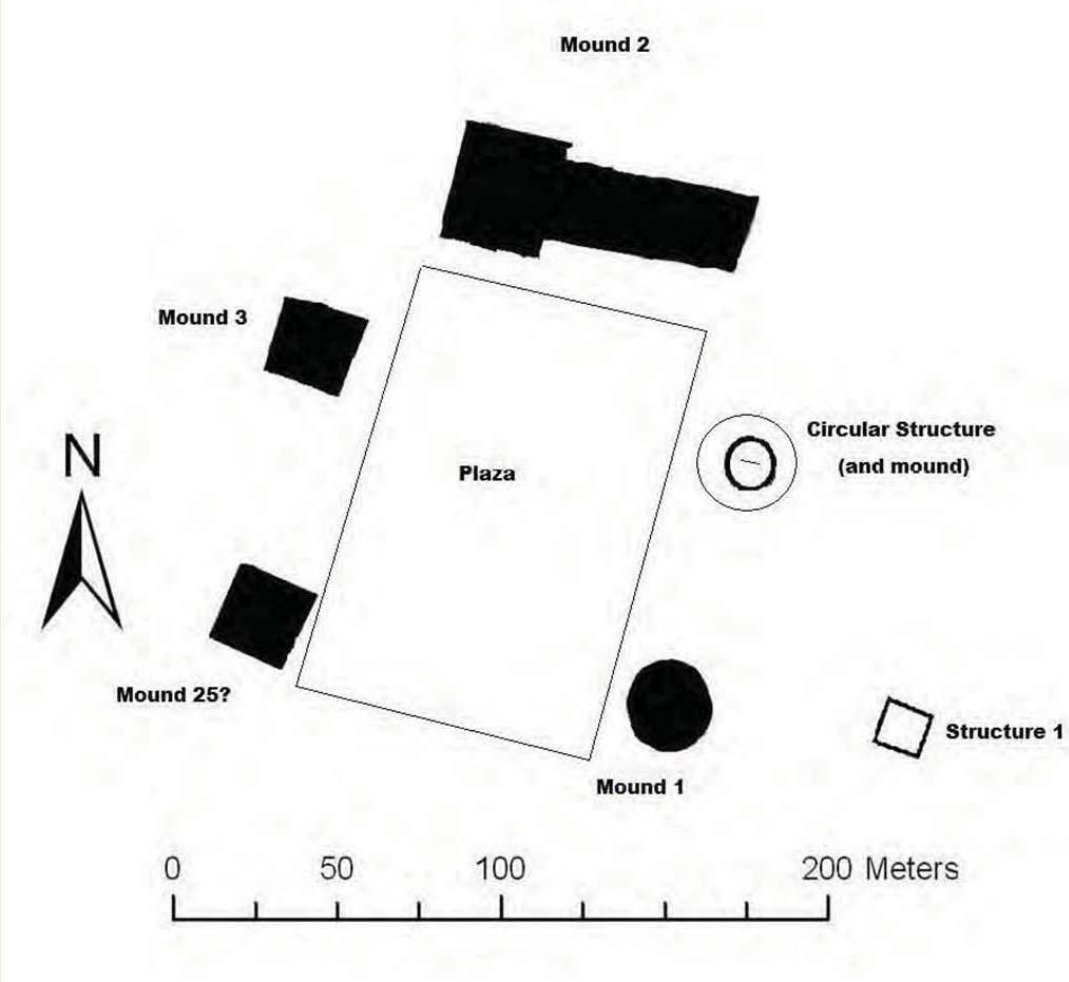

Figure 27. Plan view of major known Castalian Springs site components.

Chapter 5

Conclusions

The hypothesis that the geophysical anomaly at Castalian Springs possibly indicated a structure has been confirmed, and excavations have uncovered Mississippian architectural elements representing a large wall trench visible in the magnetometry datasets. It is notable that geophysical methods allowed us to locate a large structure that possibly would not have been detected with test excavations alone. At this site, a deep enclosing wall trench provides an ideal condition for magnetic surveys. An irregular, positive magnetic anomaly at the center most likely indicates the removed central post and adjacent ramps. GPR did not provide additional evidence from the structure, highlighting the need to experiment further with this method at other Mississippian sites to determine if this technique can detect wall trenches under other conditions.

The structure's construction, use, and dismantling, along with the post-demolition activities, appear to have occurred within a short time frame. The age of the circular structure contributes to the Castalian Springs site chronology and demonstrates the relatively short-term occupation. Also, the early fourteenth century date corresponds with the second building stage of Castalian Springs Mound 2, which has been bracketed between A.D. 1300 and 1340. A future site-wide synthesis including the time range of the use of the structure will contribute to an understanding of the occupation and possible related events at Castalian Springs.

Based on the 2010 excavations, the function of the Castalian Springs structure can only be postulated, but the location, large size, lack of occupational debris, along with the careful dismantling, point to its importance to the community as a public structure. It is

likely the singularity of the size that highlights its importance to the community as a public structure such as a council house, while the complexity of activities at the termination of the building emphasize the its sacred nature. Regional comparisons highlight the architectural similarities between circular forms at Mississippian sites and historic Native American towns and underscore the widespread variation lending credence that the circular form along with the possible related motifs of the triskle gorget, spiral shaped hearth fires, and proximity of the square-ground might be part of the basic symbology of a Native American belief system. A better understanding of the symbolic and religious meanings of the archaeological structures may be lost to time, but the location and excavation of additional large circular buildings at Mississippian and Protohistoric sites, along with further comparisons of related structures, might support these preliminary conclusions.

Any future excavations of the circular structure should focus on confirming the location of a main entry way, uncovering a larger contiguous segment of the outer wall trench, and examining the extent of the central Feature 233. It is possible that a main entry way might be located at a southwest or southeastern orientation, but in 2010 we were not able to test in those locations. Uncovering a larger portion of the outer wall trench will provide more information about the composition of the wall trench. A more thorough examination of central area of the structure, and an examination of the possible central post and any related features, could further explain the composition of the structure interior.

The location and composition of the structure highlight its importance to the community as a public building. The architectural elements it possessed shares similarities with other Southeastern structures, while at the same time each structure exhibits unique characteristics. The structure has presented a unique opportunity to examine a community building and to compare it with similar structures. At this time there is no clear classification for the building type of the circular structure at Castalian Springs, but further regional comparisons can incorporate the information presented here to provide a better understanding of regional circular and earthen public structures.

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